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ABSTRACT

A description is provided of Tennessee's Volunteer State Community College's (VSCC's) approach to defining the goals, expected outcomes, and assessment procedures of individual courses, utilizing teacher-developed course instruction manuals and standardized course syllabi. Introductory material explains why and how the approach was developed, citing recent accreditation criteria requiring that institutions demonstrate student and faculty understanding of course, program, and institutional goals and expectations. Next, information is provided on the course instruction manual, which: (1) establishes course goals and outcomes and the links between the course, the program, and the goals of the college; (2) describes placement procedures, exit criteria, and all techniques used to assess student performance; (3) outlines the primary instructional methods used in teaching the course; and (4) provides an outline of the major topics addressed in the course. Next, a description is provided of the format developed for course syllabi. Appendixes present instructions concerning the format of the course instruction manuals for developmental and remedial, career/vocational, university-parallel, and general education courses; a sample course instructional manual and syllabus for Biology 1610; and instructions concerning the format required of syllabi for all courses. (MDB)

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# DEFINING COURSE OUTCOMES AND ASSESSMENT PROCEDURES
# A MODEL FOR INDIVIDUAL COURSES

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**ABSTRACT:** Recent SACS accreditation criteria require that institutions demonstrate that faculty and students clearly understand course, program and institutional goals and expectations. Additionally, they require that a variety of assessment procedures be used to insure that institutional goals are being met. Volunteer State Community College has developed a course manual/syllabus approach to defining the goals, outcomes, and assessment procedures of individual courses that links the courses to program and institutional goals. The functions of these documents is discussed, and examples of formats and actual applications are presented.

JC 880 328

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# DEFINING COURSE OUTCOMES AND ASSESSMENT PROCEDURES
# A MODEL FOR INDIVIDUAL COURSES

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Recent accreditation criteria developed by the Southern Association of Colleges and Schools require that institutions must show that faculty and students have a clear understanding of the goals and requirements of each course in the curriculum, the nature of the course content, and the methods of evaluation employed in each course. Additionally, these criteria require that the effectiveness of instruction be periodically studied by a demonstrated variety of means of evaluating student performance. As a step toward meeting these criteria Volunteer State Community College has developed a model for defining course goals, expected outcomes, assessment procedures, instructional methodology, delivery methodology, and topical content that links each individual course with the program housing the course and with the college goal that is part of the stated mission of the college. This model involves the development at the individual course level of two documents - a course instructional manual and a model syllabus. These documents are developed by faculty teaching the course and represent a consensus of understanding among faculty as to the purpose of the course, the content of the course, the collective methods of instruction employed in the course, and the existing and feasible means of delivering the course to students.

A prerequisite to developing course manuals and syllabi for individual courses is that faculty have a clear understanding of the position of their courses in the college curriculum. It is therefore essential that the first steps be to link college programs to individual college goals, link courses to college programs, and then link the courses to individual goals of the college programs. At Volunteer State the college goals listed in the college catalog as the mission of the college were examined and expected outcomes (results) from achieving those goals developed. Following this step, program areas and definable areas of instruction were identified and a linkage established between the college goals and programs/instructional areas. The result of this linkage was to identify four programs/instructional areas housing the courses listed in the college catalog. The four identified areas were: Remedial/Developmental Program, General Education Program, Vocational Technical Program(s), and Transfer Parallel - i.e. courses that provide in-depth discipline study in general education academic disciplines or transfer courses in non general education academic disciplines.

After defining/identifying the program or applicable instructional areas, it then became necessary to identify and/or develop goals and expected outcomes for each of the areas. It was recognized, for example, that courses in the curriculum could be easily identified as serving a general education function; but the nature of that function could not be identified without first defining the function in terms of a general education goal(s) and expected outcome(s). Therefore the program areas were examined to develop program/instructional area goals/outcomes, goals and outcomes were established and approved by the faculty, and faculty were then asked to link their courses to the established goals of the programs/instructional areas housing the course. Only after establishing these linkages, could faculty then begin to examine their courses (in light of the linkages) and develop individual course goals, outcomes, and assessment techniques.

To provide consistency of information presentation and to attempt to secure the information in its most utilitarian form, it was decided that two documents would be necessary - one intended for institutional use and the other intended for student use. The document for institutional use was defined as the course instructional manual. The document for student use was identified as a modified traditional course syllabus.

## THE COURSE INSTRUCTIONAL MANUAL

The course instructional manual is intended to be the definitive document for each college course. This document is housed in the Office of the Dean of the College and within the central offices of the administrative unit responsible for the course. Thus a copy of the manual is available to peer institutions, accrediting agencies, full and part time faculty, and students. Once a manual for a course is completed, it is reviewed and, if necessary, updated on a yearly basis. As there are four identified program/instructional areas, there are four formats for the manual. The formats are very similar; but as each program/instructional area has unique features, each format has unique features. (See Appendix A - Example of Course Manual Format.)

There are four major divisions or chapters in the course instructional manual. These are course goals and outcomes, course assessment techniques, course instructional methodologies and delivery systems, and course topical outline.

**COURSE GOALS AND OUTCOMES:** This portion of the manual establishes the linkage between the course, the goals of the program housing the course, and the college goals. Here, the catalog description of the courses is given, the main goal of the course is described (the program goal toward which the course is directed), and the major expected outcomes of the course are described (the functional results of successful completion of the course). In addition, any other goals which faculty feel are important to convey are stated. The remainder of this chapter consists of a numbered list of specific outcomes that define the competencies a student must demonstrate to successfully complete the course.

**COURSE ASSESSMENT TECHNIQUES:** This section of the manual describes, where applicable, any placement procedures or exit criteria (most applicable to Remedial/Developmental courses) and explains all techniques used by faculty to assess student performance. This section also includes typical questions, exercises, performance evaluations, etc. that demonstrate the methods used to determine if the desired course outcomes are being achieved.

**COURSE INSTRUCTIONAL METHODOLOGIES AND DELIVERY SYSTEMS:** Outlined here are the primary methods used in teaching the course. It is representative of the collective methodology used by faculty teaching the course, and it is intended to serve as a resource for full and part time faculty who need to make themselves aware of the current instructional strategies available for a given course. The delivery systems sections explains and lists the methods used to present the course to students. It outlines the physical requirements for the course as it is currently being delivered. In addition, possible delivery means that are alternative to those currently used are discussed, and the requirements to accomplish that delivery are listed and explained.

**TOPICAL OUTLINE:** The last portion of the manual is a listing by topic of the major subject headings addressed by the course content. This list is much like that seen in a typical course syllabus except textbook references are not included. The structure is such that as course topics are less likely to change than are textbook references, updating will not need to be as frequent as with a syllabus.

## THE COURSE SYLLABUS

The course syllabus format (See Appendix B - Course Syllabus Format.) is intended as a guide for all courses. Although each individual instructor is expected to generate a syllabus, it is intended that the syllabi for all instructors for a given course follow a designated pattern and present to students common elements that are definitive of the course - i.e. course goals and outcomes. The syllabus format is further intended to insure that all instructors include in their syllabi information required by the Dean of Academic Affairs of the College and the college's Admissions and Retentions Committee. The syllabus is in no way intended to infringe on academic freedom, but it is intended to limit academic license and insure that students are adequately informed of the how's and why's of an instructor's course requirements, grading policies, and assessment procedures. The first chapter of the course instructional manual is included in the syllabus as a goals and outcomes section and informs the student of the course purpose and the outcomes that will indicate successful mastery of the course content and thus achievement of course goals. The assessment section of the syllabus is also derived from the course manual and informs the student of the methodology that may be employed to determine mastery of the course content.

In practice faculty in some disciplines having multiple section courses have found it convenient to work from a common syllabus after reaching agreement on grading policies, attendance policies, etc. Other faculty have preferred to take the format and tailor the content, excepting the agreed upon goals and outcomes, to their individual needs. A sample syllabus for each course (a syllabus representative of a single faculty member teaching the course) is filed in the same manner as the course instructional manual and is reviewed yearly with the course manual.

The Outcomes Project directing the development of course manuals and syllabi has proceeded in stages. To date, goals for the R/D Program have been developed, and course manuals and syllabi for all R/D courses are on file. Goals have been developed also for the General Education Program, and the development of course manuals and syllabi has begun. The development of goals for the Vocational/Technical Program(s) has just been completed. Goals for Transfer Parallel courses are developed for each individual course on an "as needed" basis in accordance with the particular discipline/program intent for the inclusion of the course in the College Curriculum. In the course of the project existing courses have been found to need modification and/or deletion from the College Curriculum as all current catalog courses have their curricular positions defined. As new courses are added to the College Catalog, the establishment of the course's position in the curriculum in terms of College goals and outcomes as well as course goals and outcomes is prerequisite. This creates a continual curricular monitor by way of the College Curriculum and Instructional Standards Committee to ensure that as course enter and leave the curricular portfolio, they do so in a predetermined, planned fashion.

This project is being aided by funds from a Title III Special Needs Grant which provides funds that allow release time for faculty and allow the purchase of instructional aids to support the college's programs.

# APPENDIX A

## COURSE INSTRUCTIONAL MANUAL

## FORMAT AND EXAMPLE

DEVELOPMENTAL AND REMEDIAL
COURSE INSTRUCTIONAL MANUAL
FORMAT

FOR YEAR:_____

SEMESTER(S) OFFERED:_____

REQUIRED TEXT(S):_____

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FORMAT
R/D COURSES
GOALS AND OUTCOMES

| | |
|---|---|
| **COURSE DESCRIPTION** | This is the general catalog description of the course. |
| **R/D GOAL** | This is the primary Remedial/Developmental Goal for which the course is responsible. This goal identifies the reason that students are required/recommended to take the course to prepare for college work. |
| **R/D OUTCOMES** | These are expected results for students achieving the R/D Goal at a prescribed level of performance as indicated by assessment techniques and grading scale. |
| **OTHER GOALS** | These are other goals which instructors feel important to convey to students. It should include any discipline and/or divisional goals that are applicable to the course. |
| **OUTCOMES STATEMENTS** | Represent the expanded, assessed competencies peculiar to and resulting from study in a specific course within the framework of the Remedial/Developmental Program. |

**NOTE: ALL OF THE INFORMATION IN THE GOAL/OUTCOMES DOCUMENT SHOULD REFLECT COLLECTIVE AGREEMENT AND CONSENSUS OF FACULTY RESPONSIBLE FOR TEACHING THE COURSE.**

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COURSE INSTRUCTIONAL MANUAL
FORMAT
CAREER/VOCATIONAL COURSES

FOR YEAR:_____

SEMESTER (S) OFFERED:_____

REQUIRED TEXT(S):_____

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## FORMAT
## COURSE GOALS AND OUTCOMES

| | |
|---|---|
| **COURSE DESCRIPTION** | This is the general catalog description of the course. |
| **PRIMARY CAREER/ VOCATIONAL GOAL(S)** | This is the primary Career/Vocational goal for which the course is responsible. This goal identifies the reason that students are required/need to take the course to achieve their personal educational goals. |
| **PRIMARY CAREER/ VOCATIONAL OUTCOMES** | These are expected results for students achieving the Primary Career/Vocational goal at a prescribed level of performance as indicated by assessment techniques and grading scale. As the goal is tailored to a particular career/vocational/ program of study, the outcomes should be expressed in terms of the program of study to which the goal is being applied. |
| **OTHER GOALS** | These are other goals which an instructor feels important to convey to students. It should include any general education goals that are relevant (i.e. further study in science, improve communication proficiency, applications of mathematical skills, etc.) and any other career/vocational goals that are applicable to the course. |
| **OUTCOME STATEMENTS** | Represent the expanded, assessed competencies peculiar to and resulting from study in a specific course within the career/vocational program of study that houses the course. |

**NOTE: ALL OF THE INFORMATION IN THE GOAL/OUTCOMES DOCUMENT SHOULD REFLECT COLLECTIVE AGREEMENT AND CONSENSUS OF FACULTY RESPONSIBLE FOR TEACHING THE COURSE.**

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COURSE INSTRUCTIONAL MANUAL
FORMAT
UNIVERSITY PARALLEL
COURSES OTHER THAN GENERAL EDUCATION

FOR YEAR:_____

SEMESTER(S) OFFERED:_____

REQUIRED TEXT(S):_____

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FORMAT
COURSE GOALS AND OUTCOMES

| | |
|---|---|
| **COURSE DESCRIPTION** | This is the general catalog description of the course. |
| **PRIMARY EDUCATIONAL GOAL(S)** | This is the major educational goal or goals for which the course is responsible. This identifies the reason that students are required/need to take the course to achieve their personal educational goals. |
| **PRIMARY EDUCATIONAL OUTCOMES** | These are expected results for students achieving the Primary Educational Goal(s) at a prescribed level of performance as indicated by assessment techniques and grading scale. As the goal is tailored to particular disciplines/areas of study, the outcomes should be expressed in terms of the discipline/area of study to which the goal is being applied. |
| **OTHER GOALS** | These are other goals which an instructor feels important to convey to students. It should include any general education goals that are relevant (i.e. further study in science, improve communication proficiency, advanced views of cultural heritage, etc.), any Career/Vocational goals, or any discipline and/or divisional goals that are applicable to the course. |
| **OUTCOMES STATEMENTS** | Represent the expanded, assessed competencies peculiar to and resulting from study in a specific course within the discipline/area of study that houses the course. |

**NOTE: ALL OF THE INFORMATION IN THE GOAL/OUTCOMES DOCUMENT SHOULD REFLECT COLLECTIVE AGREEMENT AND CONSENSUS OF FACULTY RESPONSIBLE FOR TEACHING THE COURSE.**

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GENERAL EDUCATION COURSES
COURSE INSTRUCTIONAL MANUAL
FORMAT

FOR YEAR:_____

SEMESTER(S) OFFERED:_____

REQUIRED TEXT(S):_____

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COURSE INSTRUCTIONAL MANUAL
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V. COURSE TOPICAL OUTLINE

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FORMAT
GENERAL EDUCATION COURSES GOALS AND OUTCOMES

| | |
|---|---|
| **COURSE DESCRIPTION** | This is the general catalog description of the course. |
| **GENERAL EDUCATION GOAL** | This is the primary general education goal for which the course is responsible. This goal identifies the reason that students are required to take the course to satisfy the general education requirements. |
| **GENERAL EDUCATION OUTCOMES** | These are expected results for students achieving the General Education Goal at a prescribed level of performance as indicated by assessment techniques and grading scale. As the goal is not tailored to particular disciplines, the outcomes should be expressed in terms of the discipline to which the goal is being applied. |
| **OTHER GOALS** | These are other goals which an instructor feels important to convey to students. It should include any general education goals other than the primary goal that are relevant (i.e. the three goals common to all general education courses) and any discipline and/or divisional goals that are applicable to the course. |
| **OUTCOMES STATEMENTS** | Represent the expanded, assessed competencies peculiar to and resulting from study in a specific course within the general education core of courses. |

**NOTE: ALL OF THE INFORMATION IN THE GOAL/OUTCOMES DOCUMENT SHOULD REFLECT COLLECTIVE AGREEMENT AND CONSENSUS OF FACULTY RESPONSIBLE FOR TEACHING THE COURSE.**

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## ASSESSMENT TECHNIQUES
## GENERAL EDUCATION COURSES
## FORMAT

This portion of the manual explains all criteria and techniques used in assessing the student during enrollment in the course. It should represent a survey of all faculty teaching the course and a complete listing of the methodology employed by any and all faculty. This does not involve individual course policies, grading scales, etc.; but rather, it involves descriptions of methods that are employed to determine student levels of competency in the course. It should address the assessment of the general education goal of the course, other goals of the course, and the outcomes statements of the course.

In addition this section should include sample questions that demonstrate the methodology used to teach students the relevance of the course to the general education goal that is the primary responsibility of the course as well as questions that typically address the other course goals. These questions should attempt to show students the life applications of the course material they are being required to learn.

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## INSTRUCTIONAL METHODOLOGIES AND DELIVERY SYSTEMS FORMAT

**INSTRUCTIONAL METHODOLOGIES**

This section should include the primary and other various instructional methods and educational technologies used in the presentation of the course(i.e. lecture, discussion, laboratory experiments, role play, exercises, print materials, non-print materials, CAI, self-paced materials, etc.). It should represent a collective agreement of the methods used by the faculty who are responsible for teaching the specific course.

**DELIVERY SYSTEMS**

This section should include the primary means of delivery for this course (such as "traditional classroom approach"), and any alternative means of delivery for this course (i.e. cable TV, closed-circuit television, independent study, radio, video-tape, and the like). Means of delivery should include those currently in use. This section should represent an agreement among all faculty teaching the specific course.

If alternative systems of delivery can be suggested for future use, explain here the circumstances under which these alternatives are or can be used (i.e. facility availability, special arrangement, revision of presentation, development of special materials, etc.).

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# TOPICAL OUTLINE

This section of the manual should include a complete topical outline for the entire course. Where applicable, this should include also topics for any laboratories that are part of the course. Specific textbook references or references to other sources required for the course are not necessary for the manual, as these have the potential of becoming more quickly dated than the topics themselves.

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# BIOLOGY 1610
# COURSE INSTRUCTIONAL MANUAL

FOR YEAR: 1986-87

QUARTERS OFFERED: Fall; Winter

REQUIRED TEXT(S): Biology, Curtis; Biology 1610 Supplement, VSCC Biology Faculty

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V. BIOLOGY 1610 TOPICAL OUTLINE

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## General Education Core
## Science

| | |
|---|---|
| BIO 1610 | **General Biology I (4)** An introduction to biology with emphasis on the basic principles of life including cellular structure, function and metabolism, organic molecules emphasizing DNA, RNA and protein synthesis, reproductive patterns including cell division and genetics, and an introduction to the classification of living organisms. (For further information see description of Biology course offerings at beginning of Biology section of the college catalog.) This course is intended for Biology and prehealth science majors. Three lecture, two laboratory hours per week.<br><br>Biology 1610, 20, 30 is designed to give students general scientific education and a foundation for the pursuit of a major in biology. |
| **GENERAL EDUCATION GOAL** | The general education goal of this course is to provide scientific information and instruction in the thought processes involved in the scientific method of inquiry. |
| **GENERAL EDUCATION OUTCOMES** | As a result of completing this course successfully, students will have demonstrated an acceptable level of mastery of designated scientific facts, concepts, and principles and demonstrated an understanding of and ability to apply the scientific method of inquiry. Mastery of course contents will have indicated the acquisition of a foundation suitable for pursuing further coursework in biological fields. |
| **OTHER GOALS** | This course also seeks to provide opportunities to apply problem solving skills and to acquire critical skills for the assessment and evaluation of values. Additionally, this course will require effective communication skills in both receiving and giving information. |
| **OUTCOME STATEMENTS** | Upon completion of this course the student will have demonstrated his ability to: |

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1. Describe the steps in the scientific method of inquiry and demonstrate application of this methodology.
2. Draw conclusions and parallels between isolated bodies of scientific information.
3. Distinguish between organic and inorganic compounds.
4. List 7 major organic compound functional groups, theirnames, and their general chemical properties.
5. List four groups of organic compounds.
6. Explain the general structure and chemical properties of carbohydrates.
7. Explain the naming of carbohydrates as to number of carbon chains, number of carbons, and functional group including illustrative examples of each with their functions.
8. Explain the general structure, chemical properties and functions of lipids.
9. Explain the general structure of fats and their components as well as the chemical properties of their components and the mechanism of their assembly to form a fat.
10. List and explain four types of fat related compounds including their chemical properties and functions.
11. Explain the general properties of proteins.
12. Explain the structure and chemical properties of amino acids.
13. Describe how proteins are formed and the levels of structure they may possess.
14. Distinguish between polypeptide and protein.
15. List 9 functional types of proteins including examples of each and explaining the function.
16. Explain the structure, functioning, natural regulation, inhibitory factors, and naming of enzymes giving concrete illustrations and examples.
17. Explain the general structure of nucleotides and list 10 specific examples.
18. List 3 general functions of nucleotides.
19. Explain how nucleotides function as energy carriers and as coenzymes giving concrete examples of compounds that accomplish these functions.
20. Explain the energy cycle.
21. Give a general overview of the anabolic and catabolic activities involved in metabolism.
22. Give a general explanation of the process of glycolysis.
23. Explain the steps of glycolysis.
24. Explain the fate of pyruvic acid under anaerobic conditions and under aerobic conditions.
25. Explain the electron (hydrogen) transport chain.
26. Summarize ATP production from a mole of glucose under aerobic and anaerobic conditions.
27. Explain how other carbohydrates, lipids, proteins, and nucleotides enter the catabolic process.

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28. Locate the sites of glycolysis, the citric acid cycle, and electron transport.
29. Explain the distinction between the production of 38 moles of ATP from one mole of glucose and the production of 36 moles of ATP from one mole of glucose.
30. Give an equation and a general explanation of photosynthesis.
31. Describe what occurs in the light reactions in detail and list the products of these reactions.
32. Explain in general terms what occurs in the dark reactions (Calvin Cycle) including input and output.
33. Specifically locate the sites of the light and dark reactions.
34. Explain the terms refractive index, resolution, and magnification in terms of microscope usage.
35. Explain how a light microscope functions and its resolution problems.
36. Explain, in reference to light microscopy, the terms: monocular, binocular, oil immersion, and phase contrast.
37. Explain the functioning of transmission and scanning electron microscopes and their resolving ability.
38. Explain the fluid mosaic model of membrane structure.
39. Explain the structure and function of plant cell walls.
40. Explain the structure and function of the middle lamella, plasmodesmata, hyaluronic acid, desmosomes, tight junctions, and gap junctions.
41. Distinguish between the terms protoplasm and cytoplasm.
42. Describe the structure and function of the following cell organelles:

| | |
|---|---|
| plastids (3 types) | golgi |
| vacuoles (4 types) | mitochondrion |
| lysosomes | centrioles and aster rays |
| peroxisomes | cilia and flagella |
| endoplasmic reticulum | nucleus |
| ribosomes | |

43. Explain the theory of origin of chloroplasts and mitochondria.
44. Describe the cytoskeleton and the following aspects of it:

| | |
|---|---|
| microfilaments | intermediate fibers |
| cyclosis | microtrabeculae |
| microtubules (tubulin) | |

45. Distinguish between prokaryotic and eukaryotic cells.
46. Compare and contrast plant eukaryotes, animal eukaryotes, and prokaryotes.
47. Define and demonstrate the ability to use the terms:

| | |
|---|---|
| intracellular | osmosis |
| intercellular | osmotic pressure |
| extracellular | osmotic potential |
| diffusion | capillarity |
| dialysis | absorption |

48. Define the terms solution, solvent, and solute.
49. Illustrate the usage of the terms hypertonic, hypotonic, and isotonic.

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50. Explain the phenomena of turgor pressure, plasmolysis, crenation, and hemolysis in terms of osmosis.
51. Explain brownian movement.
52. Explain and illustrate the passage of substances into and out of cells by means of the following:
    passive transport — phagocytosis
    facilitated transport — pinocytosis
    active transport — exocytosis
53. Discuss protoplasm in terms of its basic physical composition, its colloidal nature, and the role that its sol-gel transformational properties play in cellular movement.
54. Define the terms polynucleotide, polyribotide, polydeoxyribotide, ribonucleic acid (RNA), and deoxyribonucleic acid (DNA).
55. Explain the general structure of RNA molecules.
56. Explain the 3 roles that RNA molecules play in cells.
57. Explain and illustrate the general structure of the DNA molecule.
58. Describe and illustrate the duplication of DNA molecules.
59. Define the function of the DNA molecule.
60. Explain the concept of the cell cycle and its component parts.
61. Define the terms chromosome, chromatid, centromere, chromatin, and homologous pairs and explain the interrelationships between these terms.
62. Relate chromosome structure to the cell cycle.
63. Explain the concepts of ploidy and the use of N numbers.
64. Demonstrate facility in applications of the ploidy concept and N numbers.
65. Relate ploidy and N numbers to the cell cycle.
66. Explain the function of mitosis.
67. Explain the concept of the process of mitosis.
68. Explain the function of meiosis.
69. Explain the concept of the process of meiosis.
70. Explain the events that occur in the specific steps of mitosis.
71. Explain the events that occur in the specific steps of meiosis.
72. Explain the three basic sexually reproductive life patterns seen on earth and the roles that mitosis and meiosis play in these patterns.
73. Define sexual and asexual reproduction.
74. List and explain six types of asexual reproduction.
75. Explain the basic structure of the genetic code.
76. Define: triplet, codon, redundant genetic code, chain initiator codon, chain terminator codon, and RNA polymerase.
77. Explain the transcription phase of protein synthesis.
78. Explain the translation phase of protein synthesis.

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79. Define the following:
    gene (modern and mendalian definitions)
    homologous chromosomes
    allele
    homozygous
    heterozygous
    dominance
    recessiveness
    incomplete dominance
    phenotype
    genotype
    sex chromosome
    autosome
80. Explain the relationship between the modern definition for a gene and the mendalian definition.
81. State the laws of segregation and independent assortment and explain them in terms of meiosis.
82. Solve typical problems involving monohybred crosses.
83. Solve problems involving sex determination and sex linked genes.
84. Define the 1:2:1 genotypic and 3:1 phenotypic ratios.
85. Solve problems involving typical dihybred crosses.
86. Define the 9:3:3:1 phenotypic ratio.
87. Explain test crossing for heterozygousity.
88. Define and solve problems involving the simultaneous occurrance of independent events.
89. Explain and solve problems involving simple mapping of linked autosomal genes.
90. Explain and illustrate the Jacob-Manod Operon Theory of gene control. (Optional depending on time)
91. Define taxonomy and systematics.
92. List the five kingdoms and explain the type of organisms they contain.
93. Define the binomial system of nomenclature and its basis of homologous structure.
94. List the seven levels of classification below kingdom.
95. Identify Carolus Linneaus.
96. Explain the proper written expression of genus and species names.
97. Illustrate the general evolutionary relationships between the five kingdoms.
98. Identify:
    Lamark's evolutionary theory
    Darwin's evolutionary theory
    natural selection (Optional depending on time)

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BIOLOGY 1610
ASSESSMENT TECHNIQUES

**GENERAL EDUCATION GOAL**

The degree to which the outcomes of the primary goals of this course have been achieved will be determined by the cumulative assessment of the specific course outcomes. In addition, the course will be assessed by students through faculty evaluation and/or a student opinionnaire to determine student's perceptions of the achievement of stated course goals and outcomes.

**OTHER GOALS**

The degree of achievement of the desired outcomes of these goals will be assessed also by opinionnaire. The degree to which problem solving skills and critical skills for value formation and evaluation have been developed can only be assessed to a limited extent, as these are life term skills requiring assessment at a future date. However, through examinations requiring that students synthesize accumulated data and draw conclusions, problem solving practice is provided and can be assessed to some extent. Communication skills are not assessed directly. However, poor skills in receiving written and oral information and poor skills in expressing information, thoughts, and ideas in writing will result in a lowered assessment of achievement in this course.

**OUTCOMES STATEMENTS**

Outcomes statements will be assessed through short lecture quizzes, major lecture examinations, and practical laboratory examinations. The quizzes will assess the ability to assimilate small amounts of material and will focus on terminology and brief identification of concepts. They will also serve to monitor gradual progress and as a guide to the student as to the degree to which success in learning the required material is being achieved. The major lecture examinations will assess the ability to assimilate large amounts of material. They will center on identification of terms, ideas, and concepts through definition, multiple choice and specific word identification. In addition, these exams will assess the student's ability to synthesize information and draw logical conclusions through discussion questions that require information comparison and analysis.

Laboratory work will be assessed through practical examinations which will assess the student's ability to identify and recall observed examples, scientific apparatus, and phenomena and will assess the degree to which understanding of illustrated principles has been achieved.

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SAMPLE QUESTIONS USED IN ASSESSMENT

1. READ THE FOLLOWING ARTICLE.

(ARTICLE ON ALZHEIMER'S DISEASE)

What cell structure(s) is/are being referred to in this article?

Explain and illustrate in what other functions (other than the one being referred to in the article) the structure(s) is/are involved.

2. You have entered a hospital for routine surgery. Prior to surgery a nurse enters your room and starts an I.V. in your arm. In about fifteen minutes you begin to notice that you are becoming short of breath. Call the nurse and explain your symptoms and your worries about their possible association with the I.V.

3. Many skin products are advertising the presence of such substances as collagen and elastin in their contents. Explain what these subtances are and theorize with logical supportive evidence why these substances are being included in a skin product.

4. Many hair care products are advertised as being pH neutral. Explain the concept of pH and with logical supportive evidence explain the theoretical advantage of a hair product being pH neutral.

5. You are trying to remove soap residue (lipid based) from your bathtub. Explain why plain water will not do the job.

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BIOLOGY 1610
INSTRUCTIONAL METHODOLOGIES AND DELIVERY SYSTEMS

**INSTRUCTIONAL METHODOLOGIES**

This course involves two instructional environments (lecture and laboratory) with discrete instructional methodologies. The traditional lecture approach is used in the lecture sections of the course. The instructor will explain each of the topics listed in the topical outline of the course, attempting as often as is possible to provide practical illustrations and applications to everyday life. The lectures will be supplemented by assigned textbook readings and by a Biology 1610 Supplement authored by VSCC Biology Department Faculty. In addition audio-visual aids in the form of slide programs will be employed to supplement and illustrate lecture material.

Laboratory sections of this course will for the most part employ the hands-on approach to learning and reinforcing principles and concepts explained in lecture. The laboratories are constructed to follow chronologically the explanation of the lecture material as closely as is feasible. Some demonstration will occur, but the majority of the loboratories will be performed by the students either singly or in groups. The laboratories are designed to provide practical illustration and visual reinforcement not possible in the lecture sections due to size and time constraints. The laboratories will be supplemented by a laboratory manual authored by VSCC Biology Department Faculty. Some laboratories will be supplemented as well with audio-visual aids in the form of slide presentations and films. The students will be afforded exposure to and use of modern scientific tools appropriate to the discipline at the freshman level. Lecture instructors will be on hand to give instructions and guide students through the laboratory exercises. The scientific method of problem solving will be stressed in both theory and practice.

**DELIVERY SYSTEMS**

The primary means of delivery of this course is a traditional classroom approach and a traditional laboratory approach. This requires adequate classroom and laboratory/equipment facilities.

Lecture material could be delivered via Cable TV. However, the laboratories, by nature of course intent, could not be delivered in this manner. Off campus delivery would be dependent on availablity of adequate facilities and funding for adequate on site equipment.

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BIOLOGY 1610
TOPICAL OUTLINE

| LECTURE | LABORATORY |
|---|---|
| *Atoms and Molecules | |
| *Water; Acids and Bases; Buffers | General Chemistry |
| *The Flow of Energy | |
| Organic Molecules | Organic Compounds; Properties of Enzymes |
| Cellular Respiration | |
| Photosynthesis | Photosynthesis |
| Microscopy | |
| Cell Membranes | |
| | Use of the Microscope; Cell Structure |
| Cell Structure | |
| Physical Phenomena | Physical Phenomena |
| Nucleic Acids<br>RNA Structure<br>DNA Structure<br>DNA Duplication | |
| Cell Cycle | |
| Chromosomes | |
| Cell Division<br>Mitosis<br>Meiosis | Mitosis and Meiosis |
| Life Cycles | |
| The Genetic Code | |
| The Synthesis of Proteins | |
| Genetics<br>Mendalian Genetics<br>Genes and Chromosomes<br>Modern Genetic Topics | |
| Taxonomy | |
| Evolution | |

*Topics are required background and/or independent study.

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# APPENDIX B

## COURSE SYLLABUS

## FORMAT AND EXAMPLE

## RECOMMENDED FORMAT
## COURSE SYLLABUS ALL COURSES

| | |
|---|---|
| I. COURSE NUMBER AND TITLE, CREDIT HOURS<br><br>A. SEMESTER, YEAR<br><br>B. COURSE CATALOG DESCRIPTION<br><br>C. INSTRUCTOR'S NAME<br><br>1. OFFICE NUMBER<br>2. OFFICE HOURS<br><br>D. TEXTBOOK INFORMATION AND/OR OTHER REQUIRED MATERIALS INFORMATION | I. The information in Sections I., I.A. and I.B. of the syllabus will be common for all who teach the course. Catalog description includes the statement regarding pre- or co-requisites. The information in Sections I.C., and I.D., will and may be individualized. |
| II.* DEVELOPMENTAL/REMEDIAL, GENERAL EDUCATION, PRIMARY EDUCATIONAL, OR CAREER/VOCATIONAL GOAL<br><br>A. GOAL STATEMENT<br><br>B. OUTCOME STATEMENT | II. The goal statements and outcome statements, having been identified by consensus of all faculty who teach the course, should be **common** information in the syllabus. |

* THIS SECTION IS LIFTED FROM THE COURSE MANUAL.

| | |
|---|---|
| III. OTHER COURSE/DISCIPLINE GOALS<br><br>A. OTHER GOAL STATEMENTS<br><br>B. OTHER OUTCOME STATEMENTS | III. This section is more individualized allowing for differences in the emphasis used by various faculty teaching the course. |

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| | |
|---|---|
| IV. METHODS OF ASSESSMENT | IV. The methods of assessment (or the measures used to provide evidence of a student's success) should be identified in this section. It should include the various **methods** employed by the faculty member which are used to determine the student's grade. Information should be included about the use of subjective and objective assessment techniques (i.e., written examinations, oral examinations, lab work, daily assignments, classroom participation, and the like. |
| V. POLICIES AND PROCEDURES | V. All policies related to grading should be included (i.e., grades that can and cannot be earned, the use of the "I"grade, how grades are calculated, the grading scale, etc.) |
| A. GRADING | |
| B. ATTENDANCE | Policies on absences of several types should be included (i.e., excused absences, illness, snow days, etc.) |
| C. ASSIGNMENTS | |
| D. MAKE-UP WORK/EXAMS | Faculty policies on due dates of assignments, exam dates, and the like should be discussed in this section, to include the procedures on making up missed work. |
| E. CHEATING | |
| F. ADMINISTRATIVE WITHDRAWAL | |
| G. STUDENT CONDUCT | Faculty may want to include specific information on cheating and conduct, or refer to the policies written in the Student Handbook or College Catalog. |
| H. OTHER (COURSE, DISCIPLINE, OR DIVISION SPECIFIC) | |

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Faculty may wish to discuss policies on the administrative withdrawal processes and procedures.

Other refers to statements like computer copyright laws, plagiarism, etc.

VI. TOPICAL OUTLINE

VI. This section of the syllabus should include a complete topical outline of the material covered in the course. The information may be as general or specific as the faculty member wishes, but, at a minimum, should provide the student with an overview of the course content. A calendar of scheduled topics and of teaching methodologies (lecture, lab, etc.) may be included in this section.

VII. ASSIGNMENTS

VII. The faculty may or may not wish to include a detailed section of course assignments. Many assignments are determined after having met a class and recognizing time constraints. However, this section should include any information on work that will involve **additional time**, such as lab work, field trips, etc. and possible **expenses** incurred beyond the typical cost of the text. Included also may be information about the possibility of acquiring extra-credit, required dress codes, etc.

VIII. OTHER

VIII. The OTHER section does not have to be part of the syllabus. It refers to individual preferences on syllabus information such as: bibliographies, sample tests, outside resources, LRC information, and the like.

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# BIOLOGY 1610
# GENERAL BIOLOGY I (4)

FALL, WINTER QUARTERS; 1986-87

**DESCRIPTION:** An introduction to biology with emphasis on the basic principles of life including cellular structure, function and metabolism; organic molecules emphasizing DNA, RNA, and protein synthesis; reproductive patterns including cell division and genetics; and an introduction to the classification of living organisms. This course is designed for Biology majors or students majoring in areas requiring credit for a Biology major sequence. **PREREQUISITE:** An acceptable placement score on a test administered during the first week of class. Three lecture, two laboratory hours per week.

**INSTRUCTORS:** Mr. Bob Sibert - Office: W-104-E
Dr. Jim Ward - Office: W-121

**OFFICE HOURS WILL BE POSTED OUTSIDE THE DOOR BY THE SECOND WEEK OF THE QUARTER.**

**TEXTBOOK/REQUIRED MATERIALS:** Biology, 4th Edition, Helena Curtis; Biology 1610 Supplement, VSCC Biology Faculty

**THESE MATERIALS MAY BE PURCHASED IN THE CAMPUS BOOKSTORE.**

| | |
|---|---|
| **GENERAL EDUCATION GOAL** | The general education goal of this course is to provide scientific information and instruction in the thought processes involved in the scientific method of inquiry. |
| **GENERAL EDUCATION OUTCOMES** | As a result of completing this course successfully, students will have demonstrated an acceptable level of mastery of designated scientific facts, concepts, and principles and demonstrated an understanding of and ability to apply the scientific method of inquiry. Mastery of course contents will have indicated the acquisition of a foundation suitable for pursuing further coursework in biological fields. |
| **OTHER GOALS** | This course also seeks to provide opportunities to apply problem solving and to acquire critical skills for the assessment and evaluation of values. Additionally, this course will require effective communication skills in both receiving and giving information. |
| **OUTCOME STATEMENTS** | Upon completion of this course the student will have demonstrated the ability to: |

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1. Describe the steps in the scientific method of inquiry and demonstrate application of this methodology.
2. Draw conclusions and parallels between isolated bodies of scientific information.
3. Distinguish between organic and inorganic compounds.
4. List 7 major organic compound functional groups, their names, and their general chemical properties.
5. List four groups of organic compounds.
6. Explain the general structure and chemical properties of carbohydrates.
7. Explain the naming of carbohydrates as to number of carbon chains, number of carbons, and functional group including illustrative examples of each with their functions.
8. Explain the general structure, chemical properties and functions of lipids.
9. Explain the general structure of fats and their components as well as the chemical properties of their components and the mechanism of their assembly to form a fat.
10. List and explain four types of fat related compounds including their chemical properties and functions.
11. Explain the general properties of proteins.
12. Explain the structure and chemical properties of amino acids.
13. Describe how proteins are formed and the levels of structure they may possess.
14. Distinguish between polypeptide and protein.
15. List 9 functional types of proteins including examples of each and explaining the function.
16. Explain the structure, functioning, natural regulation, inhibitory factors, and naming of enzymes giving concrete illustrations and examples.
17. Explain the general structure of nucleotides and list 10 specific examples.
18. List 3 general functions of nucleotides.
19. Explain how nucleotides function as energy carriers and as coenzymes giving concrete examples of compounds that accomplish these functions.
20. Explain the energy cycle.
21. Give a general overview of the anabolic and catabolic activities involved in metabolism.
22. Give a general explanation of the process of glycolysis.
23. Explain the steps of glycolysis.
24. Explain the fate of pyruvic acid under anaerobic conditions and under aerobic conditions.
25. Explain the electron (hydrogen) transport chain.
26. Summarize ATP production from a mole of glucose under aerobic and anaerobic conditions.
27. Explain how other carbohydrates, lipids, proteins, and nucleotides enter the catabolic process.
28. Locate the sites of glycolysis, the citric acid cycle, and electron transport.
29. Explain the distinction between the production of 38 moles of ATP from one mole of glucose and the production of 36 moles of ATP from one mole of glucose.
30. Give an equation and a general explanation of photosynthesis.

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31. Describe what occurs in the light reactions in detail and list the products of these reactions.
32. Explain in general terms what occurs in the dark reactions (Calvin Cycle) including input and output.
33. Specifically locate the sites of the light and dark reactions.
34. Explain the terms refractive index, resolution, and magnification in terms of microscope usage.
35. Explain how a light microscope functions and its resolution problems.
36. Explain, in reference to light microscopy, the terms: monocular, binocular, oil immersion, and phase contrast.
37. Explain the functioning of transmission and scanning electron microscopes and their resolving ability.
38. Explain the fluid mosaic model of membrane structure.
39. Explain the structure and function of plant cell walls.
40. Explain the structure and function of the middle lamella, plasmodesmata, hyaluronic acid, desmosomes, tight junctions, and gap junctions.
41. Distinguish between the terms protoplasm and cytoplasm.
42. Describe the structure and function of the following cell organelles: plastids (three types), vacuoles (4 types), lysosomes, peroxisomes, endoplasmic reticulum, ribosomes, golgi, mitochondrion, centrioles and aster rays, cilia and flagella, nucleus.
43. Explain the theory of origin of chloroplasts and mitochondria.
44. Describe the cytoskeleton and the following aspects of it: microfilaments, cyclosis, microtubules (tubulin), intermediate fibers, microtrabeculae.
45. Distinguish between prokaryotic and eukaryotic cells.
46. Compare and contrast plant eukaryotes, animal eukaryotes, and prokaryotes.
47. Define and demonstrate the ability to use the terms: intracellular, intercellular, extracellular, diffusion, dialysis, osmosis, osmotic pressure, osmotic potential, capillarity, absorption, adsorption.
48. Define the terms solution, solvent, and solute.
49. Illustrate the usage of the terms hypertonic, hypotonic, and isotonic.
50. Explain the phenomena of turgor pressure, plasmolysis, crenation, and hemolysis in terms of osmosis.
51. Explain brownian movement.
52. Explain and illustrate the passage of substances into and out of cells by means of the following: passive transport, facilitated transport, active transport, phagocytosis, pinocytosis, exocytosis.
53. Discuss protoplasm in terms of its basic physical composition, its colloidal nature, and the role that its sol-gel transformational properties play in cellular movement.
54. Define the terms polynucleotide, polyribotide, polydeoxyribotide, ribonucleic acid (RNA), and deoxyribonucleic acid (DNA).
55. Explain the general structure of RNA molecules.
56. Explain the 3 roles that RNA molecules play in cells.
57. Explain and illustrate the general structure of the DNA molecule.
58. Describe and illustrate the duplication of DNA molecules.
59. Define the function of the DNA molecule.
60. Explain the concept of the cell cycle and its component parts.

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61. Define the terms chromosome, chromatid, centromere, chromatin, and homologous pairs and explain the interrelationships between these terms.
62. Relate chromosome structure to the cell cycle.
63. Explain the concepts of ploidy and the use of N numbers.
64. Demonstrate facility in applications of the ploidy concept and N numbers.
65. Relate ploidy and N numbers to the cell cycle.
66. Explain the function of mitosis.
67. Explain the concept of the process of mitosis.
68. Explain the function of meiosis.
69. Explain the concept of the process of meiosis.
70. Explain the events that occur in the specific steps of mitosis.
71. Explain the events that occur in the specific steps of meiosis.
72. Explain the three basic sexually reproductive life patterns seen on earth and the roles that mitosis and meiosis play in these patterns.
73. Define sexual and asexual reproduction.
74. List and explain six types of asexual reproduction.
75. Explain the basic structure of the genetic code.
76. Define: triplet, codon, redundant genetic code, chain initiator codon, chain terminator codon, and RNA polymerase.
77. Explain the transcription phase of protein synthesis.
78. Explain the translation phase of protein synthesis.
79. Define the following: gene (modern and mendalian definitions), homologous chromosomes, allele, homozygous, heterozygous, dominance, recessiveness, incomplete dominance, phenotype, genotype, sex chromosome, autosome.
80. Explain the relationship between the modern definition for a gene and the mendalian definition.
81. State the laws of segregation and independent assortment and explain them in terms of meiosis.
82. Solve typical problems involving monohybred crosses.
83. Solve problems involving sex determination and sex linked genes.
84. Define the 1:2:1 genotypic ratio and 3:1 phenotypic ratio.
85. Solve problems involving typical dihybred crosses.
86. Define the 9:3:3:1 phenotypic ratio.
87. Explain test crossing for heterozygousity.
88. Define and solve problems involving the simultaneous occurrence of independent events.
89. Explain and solve problems involving simple mapping of linked autosomal genes.
90. Explain and illustrate the Jacob-Manod Operon Theory of gene control. (Optional depending on time)
91. Define Taxonomy and Systematics.
92. List the five kingdoms and explain the type of organisms they contain.
93. Define the binomial system of nomenclature and its basis of homologous structure.
94. List the seven levels of classification below kingdom.
95. Identify Carolus Linneaus.
96. Explain the proper written expression of genus and species names.
97. Illustrate the general evolutionary relationships between the five kingdoms.
98. Identify: Lamark's evolutionary theory, Darwin's evolutionary theory, natural selection. (Optional depending on time)

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**ASSESSMENT:** The degree to which the outcomes of the primary goals of this course have been achieved will be determined by the cumulative assessment of the specific course outcomes. In addition, the course will be assessed by students through faculty evaluation and/or a student opinionnaire to determine student's perceptions of the achievement of stated course goals and outcomes.

The degree of achievement of the desired outcomes of these goals will be assessed also by opinionnaire. The degree to which problem solving skills and critical skills for value formation and evaluation have been developed can only be assessed to a limited extent, as these are life term skills requiring assessment at a future date. However, through examinations requiring that students synthesize accumulated data and draw conclusions, problem solving practice is provided and can be assessed to some extent. Communication skills are not assessed directly. However, poor skills in receiving written and oral information and poor skills in expressing information, thoughts, and ideas in writing will result in a lowered assessment of achievement in this course.

Outcomes statements will be assessed through short lecture quizzes, major lecture examinations, and practical laboratory examinations. The quizzes will assess the ability to assimilate small amounts of material and will focus on terminology and brief identification of concepts. They will also serve to monitor gradual progress and as a guide to the student as to the degree to which success in learning the required material is being achieved. The major lecture examinations will assess the ability to assimilate large amounts of material. They will center on identification of terms, ideas, and concepts through definition, multiple choice and specific word identification. In addition, these exams will assess the student's ability to synthesize information and draw logical conclusions through discussion questions that require information comparison and analysis.

Laboratory work will be assessed through practical examinations which will assess the student's ability to identify and recall observed examples, scientific apparatus, and phenomena and will assess the degree to which understanding of illustrated principles has been achieved.

**POLICIES AND PROCEDURES:**

**A. GRADING:** There will be <u>three</u> major examinations during the quarter. In general, each exam will cover the material discussed in lecture and the assigned material in the textbook beginning where the previous exam material stopped.

Announced brief quizzes will be given. (The first will be given in your laboratory sections in 1610 and used for placement as well as a course grade.) The average of these quiz grades, dropping the lowest, will be used as a fourth major exam grade.

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A comprehensive final examination will be given during the scheduled final examination period. (Check examination schedule for time and date.) **NO FINAL EXAMINATIONS WILL BE GIVEN EARLY OR LATE (SCHOOL POLICY).**

Grades for this course will be determined as follows:

50% - Three lecture examinations plus a fourth exam grade derived from the average of quiz grades, dropping the lowest of the quiz grades.

25% - Laboratory grade as determined by the lab instructor.

25% - Final examination grade.

The letter grades to be assigned in this course and their corresponding numerical values are as follows:

A = 90 to 100 final average on all work
B = 80 to 90 final average on all work
C = 70 to 80 final average on all work
D = 60 to 70 final average on all work
F = Below 60 final average on all work
I = Incomplete - to be given **at the discretion of the instructor** when a student, **for unavoidable reasons acceptable to the instructor,** has been unable to complete a small portion of the coursework within the normally allotted time. To receive this grade instead of F, the student must contact the instructor **prior** to the assignment of final grades and make arrangements, if possible, to complete the coursework. If the coursework is not completed by one week before the first day of final examinations for the **next** quarter, this grade will be changed to F by the Office of Admissions and Records. (See college catalog for policies.)
N = Audit - no grade or credit
W = Withdrawn from course (See college catalog for the last date during the quarter on which this grade can be assigned.)

**NOTE: THE INSTRUCTOR DOES HAVE THE RIGHT TO ADMINISTRATIVELY WITHDRAW A STUDENT FROM CLASS RESULTING IN A GRADE OF W; BUT THIS IS NOT AUTOMATIC. STUDENTS WISHING TO WITHDRAW MUST DO SO THROUGH THE OFFICE OF ADMISSIONS AND RECORDS.**

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**B. ATTENDANCE:** You will not receive a specific grade for attendance. Your attendance will be recorded. Students demonstrating poor attendance seriously impair their ability to succeed and often impose a burden on other students. As indicated in the college catalog, the instructor has the right to request that the Dean of the College withdraw any student demonstrating poor attendance. When attendance is poor, leniency should not be expected in borderline situations. Your input in the classroom is of value to the instructor, yourself, and other students. Poor attendance deprives all involved.

**C. ABSENCE FROM EXAMINATIONS OR QUIZZES:** Quizzes and examinations will be given **only** at the times assigned by the instructor unless a student is specifically excused by the Dean of the College. **There will be no exceptions.** Absence from a quiz will result in a grade of zero with no opportunity to make up the missed quiz. (Note: This will be the dropped lowest quiz grade.) Absence from a major examination (unless excused by the Dean of the College) will result in a grade of zero. If a major examination is missed, the student should submit a written request to the instructor stating the reasons for missing the examination and requesting a make-up grade. If the instructor deems it appropriate, the grade achieved on the comprehensive portion of the final examination **may** be substituted for **one and only one** missed major examination. **There will be no exceptions.** Absence from the final examination will automatically result in a grade of F. **NOTE THAT OFFICIAL ABSENCES FROM THE COLLEGE (ABSENCES EXCUSED BY THE DEAN OF THE COLLEGE) ARE NOT SUBJECT TO THESE POLICIES AND WILL BE HANDLED ON A CASE BY CASE BASIS.**

**D. INCLEMENT WEATHER POLICY:** If Vol State is officially open, any Biology class or laboratory section will meet as scheduled, all assignments will be due, and any scheduled tests, quizzes, or exams will be given. Any missed work will be subject to the policies outlined in this course syllabus.

If Vol State is officially closed, all lecture assignments will be due and any tests, quizzes, or exams will be given **at the next regular class meeting.** Lab sections missed due to the closing of the school will be made up or deleted on an individual lab section basis.

**E. MISCELLANEOUS:** No smoking, eating, drinking, or children in class **please.** The lab syllabus is located in the Biology 1610 Supplement. This syllabus contains information particularly pertinent to lab. The student is also encouraged to read the Volunteer State Community College Student Handbook and the Volunteer State Community College Catalog, as both of these publications contain information pertinent to this course.

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**F. PLACEMENT:** Many students attempting a college level Biology course designed for majors find that they have insufficient biological or chemical skills to succeed at a level necessary to continue in their desired field. To attempt to correct any such deficiencies, Volunteer State has a developmental level Biology course just for such situations. The first quiz on chemistry (given in your first lab) and the first quiz in your lecture class (that covers the first week's work) will be used by your instructor to recommend that you drop and add this course (Biology 0660) to obtain the background necessary for success. You are strongly urged to follow this advice.

**G. TOPICAL OUTLINE: ASSIGNMENTS (REFERRING TO TEXTBOOK AND SUPPLEMENT) AND LABORATORY LECTURE CORRELATIONS:**

| LECTURE TOPIC | READING ASSIGNMENT | LABORATORY CORRELATION |
|---|---|---|
| Introduction | | |
| Atoms and Molecules* | Chapt. 1, 2, and | |
| Water; Acids and Bases; | 8-pp. 157-165; and | |
| Buffers* | 1610 Supplement- first | |
| The Flow of Energy* | section | Lab 1 and Lab 2 |
| Organic Molecules | Chapts. 3; 8-pp. 167-184; 14-pp. 281 | Lab 3 |
| Cellular Respiration | Chapt. 9 | |
| Photosynthesis | Chapt. 10 | Lab 4 |
| Examination I (COVERS LECTURE TOPICS ONLY) | | |
| Microscopy | Chapt. 4-pp. 88-96 | Lab 6 |
| Cell Membranes | Chapt. 6-pp. 125-126 | Lab 6 |
| Cell Structure | Chapts. 4-pp. 76-88; 5-pp. 97-123 | Lab 6 |
| Physical Phenomena Associated With Cells | Chapt. 6-pp. 126-137 | Lab 7 |
| Nucleic Acids | | |
| RNA Structure | Chapt. 15-pp. 297-299 | |
| DNA Structure | Chapt. 14 | |
| DNA Duplication | Chapt. 14 | |
| Examination II (COVERS MATERIAL AFTER EXAMINATION I) | | |

***NOTE:** THESE TOPICS ON GENERAL CHEMISTRY WILL **NOT** BE COVERED IN LECTURE. YOU ARE RESPONSIBLE FOR THE CONTENT OF THESE CHAPTERS AND THAT OF THE 1610 LAB SUPPLEMENT (WHICH IS A DISTILLATION OF THE TEXTBOOK CHAPTERS). **YOU WILL BE TESTED** ON THIS MATERIAL IN YOUR FIRST LABORATORY MEETING. THE GRADE MADE ON THIS TEST WILL COUNT AS A QUIZ GRADE AND ALSO BE USED FOR PLACEMENT PURPOSES.

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| | | |
|---|---|---|
| Cell Cycle | Chapt. 7-pp. 141-143 | |
| Chromosomes | Chapt. 7-p. 143 | |
| Cell Division | | Lab 8 |
| Mitosis | Chapt. 7-pp. 143-150 | Lab 8 |
| Meiosis | Chapt. 12 | Lab 8 |
| Life Cycles | Chapt. 12-pp. 251-252 | Lab 8 |
| The Genetic Code | Chapt. 15-pp. 295-297 | |
| The Synthesis of Proteins | Chapt. 15-pp. 295-297 | |

Examination III (COVERS MATERIAL AFTER EXAMINATION II)

| | | |
|---|---|---|
| Genetics | Section 3 - Text | |
| Mendalian Genetics | Chapt. 11 | |
| Genes and Chromosomes | Chapt. 13 | |
| Modern Genetic Topics | Chapts. 15,16,17,18 | |
| Taxonomy | Chapt. 19 | |
| Evolution | Text Introduction-pp. 1-13; Section 7-Text | Lab 1 - Biology 1620 |

FINAL EXAMINATION - Comprehensive (Heavier emphasis will be placed on material covered after examination 3, but material from examinations 1, 2, and 3 will be included.)

**SPECIAL NOTE FOR THOSE FEW WHO NEED IT:**

Unnecessary disturbances of class (lab or lecture) **will result in a deduction of points from your final grade** at the discretion of the instructor. Do not interrupt class by being late or visiting with your neighbor in class. It may cause other students to miss important information. You will not necessarily be notified that points have been deducted. Serious disturbances and/or infractions of school regulations will be referred to the Associate Dean for Student Services. **In addition**, work on tests, quizzes, and assignments must be your own. "Borrowing" information will result in a **zero** for that quiz, test, or assignment **and** an automatic **F** for the course if there is a repeated incident.

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